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# Distribution Methods -- By Hand and By Machine

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# Distribution Methods—By Hand and by Machine*

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In choosing within the field of machine accounting a topic that would be of general interest, it was necessary to take for granted some previous knowledge of this subject. It has been assumed that the reader is fairly familiar with the machines in the field, that he knows their important mechanical features, and that he has some knowledge of their relative adaptability to specific accounting functions. On the basis of this knowledge of the fundamentals of machine accounting, there is presented here a discussion of a subject very closely connected with the daily interests of the practising accountant, viz., "machine applications to distribution problems." The discussion is applicable to several of the distribution problems occurring in the industrial cost-accounting field, and equally so to certain others lying outside that field. The treatment is largely technical, with little attention to theory.

For purposes of this discussion distribution is defined as the posting of a large number of different items to a smaller number of accounts. A sorting and summarizing process may precede the actual posting. The "account," so-called, may be a cost sheet, a line on a tabulated report, a column on a multi-column spread sheet or even a register of an accounting machine. In effect, however, distribution is a sorting, accumulating, summarizing process, resulting finally in the posting of a large number of items, individually or in summary, to a smaller number of accounts. It follows that fundamentally every distribution problem is the same.

There are numerous methods of distribution, by hand and by machine, in actual use today. Any tool can be applied to any distribution problem and the desired information secured; but, in any given case, some one method can be determined to be the most efficient in speed, accuracy and cost. Frequently the most important factor is cost. In some cases the old style pen method of posting each item individually to a multi-column spread sheet is the proper method. At the other extreme are cases where punched card tabulating machines provide the only efficient method. Between are cases calling for calculators, adding-listing

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machines, multi-counter bookkeeping and accounting machines, duplicating machines, etc. Usually there is one best method in any given case. Special conditions relative to personnel, existing equipment, and pressure of time may become the determining factors in the decision. In any case the one best method can be determined only after intensive study and research relative to the job to be done and every operation and procedure related, even remotely, to its accomplishment. In such an analysis it is necessary to start at the origin of the transaction, follow it through the distribution process and trace the result to the final report. A change in a form or a procedure prior or subsequent to the actual distribution job may materially facilitate that job and may even alter the decision in the selection of the one best method.

There is presented below a brief outline of the most popular distribution methods in actual use, followed by a discussion of the variables that are present in any distribution problem, which determine, in any given case, the selection of the one best method.

It is not the intention to determine which method or which machine is preferable in each case, but a basis for the analysis of any situation is suggested.

First there are what might be called the fundamental methods of distribution, which go to make up any actual method in use. They are as follows:

1. The posting in order of each item to unit accounts.
   (a) By hand
   (b) By machine
2. The posting in order of each item to a multi-column spread sheet.
   (a) By hand
   (b) By machine
3. "Leafing" through the posting media, selecting all of one item, then all of another, etc.—the so-called "exhaust method."
4. Distribution, item by item, into a multi-key-selected-register bookkeeping or accounting machine.
5. The sorting of unit posting media and the accumulation of totals.
   (a) By hand
   (b) By machine

All existing methods of distribution are combinations and variations of these five fundamental methods. These actually

existing methods are discussed below, briefly, but somewhat in detail.

1–a. The first method to be mentioned should be that of pen posting to unit accounts, item by item, with a periodic totaling and/or balancing of the account. In one sense this is not a real distribution, but only a posting operation.

1–b. Posting by machine to unit accounts is similar to the first method described. It has the usual advantages of machine posting over hand posting—speed, legibility, and accuracy. It is often combined with a distribution on a second basis.

2–a. A second pen method is that of pen-posting to a multi-column spread sheet, item by item, totaling the columns mentally or by machine, then pen posting the totals to unit accounts. In some cases the spread sheet is used as a final report. This is an old familiar method still in common use. In some cases it should be replaced by other methods; in some cases it should not.

2–b. A logical development of the pen-posted spread sheet is distribution by machine to a multi-column spread sheet, using machines with a number of horizontal vertical adding registers, one for each column. Perhaps the only advantages over the pen method are greater legibility and accuracy, an automatic total of each group, and a grand total of all groups for proof. The totals secured may be posted to unit accounts, by hand or by machine, or the tabular sheet itself may be used as a report. Perhaps the necessity for this tabular report, in certain cases, is the primary reason for the adoption of this method. In some cases it is combined with a posting operation.

3. The so-called "exhaust method" of distribution involves turning through and selecting similar items from all of the posting media, adding them into calculators or adding listing machines or posting them to unit accounts. After going through on one item, usually the most active one, it is necessary to go through the media again on the next most active item, and so on until all items have been abstracted from the media.

4. A common practise in distribution involves the use of multi-counter machines without horizontal tabulation, the counters or registers being selected from the keyboard instead of by carriage position. The items are introduced into the machine one by one by setting up the amounts on the keyboard and depressing the proper register or counter key. At the end of the run the totals of each group are printed on a summary sheet.

5–a. The next method is based on the hand sorting of unit media; this method is very commonly used and is entitled to a greater degree of respect than is sometimes accorded to it. It is performed under all sorts of conditions, on all sorts of devices, and with many types of unit-sorting media. Sorting may be done in piles on a table, the piles being arranged in a circle or in marked squares. Again, pigeon-holes may be used, in a circular rack, a vertical rack, or a rack wholly or partly on an angle; sometimes one classification is laid out across the top of the rack horizontally, and another is listed vertically, making it possible to effect classification on two bases with one handling of the media. In addition to these devices there are available patented products particularly for the sorting of large-sized media. One device consists of a series of shingle-fashion tabs numbered from 1 to 25 or 30, or even more. The sorting operation is a lifting of a numbered tab and the inserting of the media to be sorted into the proper compartment. Another device is a similar arrangement, except that the compartments may number as high as 200, and are arranged shingle fashion on a roller—bearing sliding rack, making it possible to bring any compartment to a single given sorting point. Hand sorting is almost a science, and research on the subject has brought out some interesting facts. Recently some attention has been given to the possibility of two handed sorting; under certain conditions this method increases efficiency to a marked degree. Considerable discussion has arisen over the question of sorting into 10's or 100's, in large sorts; to date the 10's seem to have preference over the 100's.

At the completion of the hand-sorting process, piles or groups of media may be totaled by machine or by hand. Machines applicable to this operation are calculators and adding listing machines. On the adding-machine-type bookkeeping machine it is possible to list each item on the tape, then sub-total, tabulate and post the total to a unit account, perhaps picking up the old balance, printing the new balance and proving. Many variations of the procedure are possible on this type of bookkeeping machine. If the posting process is not combined with the adding process, it must follow it. The posting may be by hand or by machine, to unit accounts, or to a multi-column spread sheet in order to secure a distribution on the second classification.

The hand-sorting method, of course, requires the existence or creation of unit sorting media. These may exist automatically,

as in the case of material requisitions, individual worker's time tickets, preprinted unit slips, etc. In other cases they must be created by any one of several methods, the most popular of which are the following:

1. A perforated copy of the original media, typewritten or prepared on an autographic register, perhaps double or triple spaced.
2. A shingled copy of the original media.
3. Line or spot carbonized form to secure spacing between the items, perhaps every third item carboning through on the same form, perforated for separation, or perhaps having as many copies of the form as there are items on the original form.
4. Perforated tag board prepared in conjunction with a prelisting of the items to be distributed, or with a previous computation of these items.
5. Tagboard automatically printed, cut and stacked in conjunction with a pre-listing operation.
6. By a ticket issuing machine—a separate operation.
7. By a machine which issues a ticket in conjunction with a posting operation.
8. By repeat print on tag board in conjunction with a posting operation, this tag board to be later cut, or separated at the perforations, or torn off, to create unit posting media.
9. By a machine which issues a ticket on a miscellaneous classification while the items belonging to the more active accounts are being distributed directly into accumulating registers.
10. By the use of preprinted unit slips, requiring only the checking of items and the addition of amounts or quantity, to create unit slips. The so-called "biff ticket" method is a good example.
11. By a duplicating operation. The shingling of item slips on a copy of the sales invoice by the ditto process is an example of this method.
12. The automatic punching of a card on a key punch-billing machine hookup.

5–b. It might be noted that the familiar punched card method is only a unit-sort method; the steps are the same as in the case of a hand-sort method: the creation of a posting media on a key punch, a sorting operation on the sorter and an accumulation on the tabulator.

Many variations and combinations of these methods are found in actual practice. Frequently distribution on the first classification is secured by hand sorting the original media; (in some cases

the media may come to the distribution section automatically grouped by some previous operation; e.g., the posting of sales invoices to accounts receivable arranged on a geographical basis gives an automatic grouping of sales invoices by salesmen or territories). Following this hand-sort on one basis, any one of several methods may be used to secure distribution on a second basis or sub-classification:

1. The items may be entered by hand or machine to multi-column spread sheets, and a mental or machine accumulation of the columns will give the total of each account in the second group; a re-capitulation of column totals will give the grand totals of the groups on the second basis.

2. After a hand sort on one classification, the items may be entered directly into the various counters of a multi-key-selected-register machine. Totals of the registers give the totals of the account on the second basis, within each major group secured by hand sort on the first basis. A re-capitulation of these totals gives the grand total of each group on the second basis.

3. Following the hand sort for the first distribution the so-called exhaust method may be used on the second, and the items entered into calculators or adding listing machines. The totals thus secured may be posted to multi-column spread sheets or to peg-board strips and recapped horizontally and vertically for grand totals.

The so-called peg-board strips can be used as original media, assembled into flexible spread sheets for accumulation, and then filed permanently in binders. They have distinct advantages for certain types of work.

This is admittedly a very incomplete survey of the methods of distribution in actual use today. There are dozens of others. Space does not permit further discussion at this point. However, it is believed that these are the fundamental methods and that all others are variations and combinations of them.

Earlier in the discussion it was stated that fundamentally every distribution problem is the same, and it is—fundamentally. However, the details of each distribution problem are widely dissimilar to those of every other such problem. The difference is due to a number of variables existent in each problem, such as the following:

1. The purpose of the distribution, i.e., the information desired and the use to be made of it. Frequently information is carefully

collected and presented, only to be scanned and filed away for future reference. Again, information which at one time served a useful purpose may be useless now and should be discontinued. Very often detailed information is obtained when summarized information would be adequate. Only when its use is exactly known can information be acquired efficiently.

2. The value of the information to be obtained. The use to be made of the information should determine its value. The cost of obtaining it must be less than that value. The most difficult task in any distribution problem is to measure the cost against value received. The cost is relatively easy to determine—though very grievous errors are often made. But the evaluation of the information obtained is a vastly more difficult task. Theoretically it is simple. Net profits must be greater with this information than without it. Practically, it is often difficult to demonstrate to the management that certain given information is or is not worth its cost.

3. The degree of error allowable—the necessity for checking and for proof against established controls. All methods of proof involve some type of repeated effort and therefore cost money. Some proofs are more accurate than others—and cost more money. Increased accuracy of information usually means increased value, but not always. Frequently approximations can be obtained at much less cost than proof-to-the-cent accuracy and may serve the purpose as satisfactorily. It is difficult in any given case to draw the line at which increased accuracy ceases to be worth its cost. Perhaps the double-entry system, so admirable, so necessary for check and balance in many cases, leads to exaggerated zeal in many types of distribution problems.

4. The routine prior to the distribution—the preparation of the media-coding-computation, etc. Some methods of distribution require more exact and complete preliminary routine than do others. This routine must be analyzed carefully, perhaps changed, and coördinated with the distribution operation. The two operations may at certain points be combined. A prelisting operation may afford unit-sorting media, or a computation job may be combined with a distribution on one basis, etc. The prior routine should be so arranged that the exact point at which the actual distribution job starts should be hard to determine.

5. The distribution media. At no point in the distribution problem is there found a greater variety of possibilities than in the

media. Time tickets, material requisitions, sales invoices, etc., come to the distribution operation in all degrees of perfection or imperfection. They may be machine prepared or hand-written, legible or illegible, the data arranged in the desired sequence or otherwise. A preceding operation may have resulted in a unit-sorting media, or a change may be made that will furnish such media, if desired. The media may have been previously sorted on one classification basis, or they often can be so sorted in a properly designed prior routine. A careful analysis may greatly facilitate the actual distribution problem. For example, a preprinted sales-order blank may assist in making out the original sales order; it may facilitate costing and pricing, either by including costs and prices, or by providing for pasting on price slips for different classes of trade; it may assist in the extension of the items; and it may at the same time materially assist in the abstracting of sales-analysis information. Other preprinted forms automatically become unit slips for hand sorting. A modification of the media from which information is to be abstracted is important in many cases. With punched-card tabulating installations it is often vital.

6. In the frequency of the distribution there are two fundamental principles opposing each other. It is admitted that timeliness of information increases its value. On the other hand it is equally true that mass production reduces cost, in the office as well as in the factory, and that timeliness will therefore increase the cost of information. Some distributions must be made daily as the resulting information is well worth its cost. In other cases a weekly or a monthly distribution is preferable, for the reduced cost more than offsets the decreased value.

7. The number of media per distribution period is a fundamental factor in the selection of a method and machine for a distribution problem, yet it is frequently given too little consideration. Unless the volume of work is sufficiently large, no machine should be purchased. Hand sorting or pen posting to a spread sheet may be highly efficient. If machine methods are desirable, capacity beyond the requirements of the job should not be purchased. A highly specialized machine used only part time may be an expensive investment, or it may not. A cost analysis, in terms of the volume of work, is necessary. The usual result of such an investigation is to reveal a surprisingly small number of media per distribution period.

8. The number of items per medium. It is surprising that in many actual cases the average number of items is not known. If there is only one item, unit sorting media are automatically provided. If there are several items, but for certain distributions the total is the figure used, there still exist unit-sorting media for that distribution—a fact too often disregarded. Too many items eliminate the possibility of the so-called exhaust method, decrease the feasibility of a double run on machines with limited counter capacity and necessitate the selection of the items in the order in which they appear on the medium. A larger number of items facilitates the use of punched card tabulating equipment, for much of the punching can be done in duplicate. It facilitates the distribution job if the items on the medium are grouped on one basis of classification. Frequently this can be accomplished by the proper design of the posting medium.

9. The size of the item, i.e., the number of digits. The work involved in pen posting or entering to machine keyboards is directly related to the size of the items. The work involved in key punching is determined by the size of the largest item in the class; this item determines the size of the field, and spacing is done one column at a time. Also, counter capacity and the maximum number of counters, on some types of machines, are determined by the size of the largest items in the class. On relatively small items, counters may be split into two or three divisions, thereby increasing the number of classes or accounts to be handled at one run. In uniformly large items it may be possible to drop certain of the less significant figures, if proof-to-the-cent accuracy is not essential.

10. The nature of the items, whether one or more amounts. So-called "items" for distribution may be in terms of value only, quantity only or both quantity and value. Value may include only one amount or more than one. For example, in sales analysis, value may include selling price only, or both cost and selling price, or selling price and profit. Similarly, quantity may include more than one amount.

Machines with large capacity counters may handle two or more factors at once; e.g., cost and selling price, selling price and profit, or quantity and value. In one installation of a well-known distribution machine it is necessary to distribute selling price, profit and quantity. At one run, selling price is distributed, and on a second run quantity and profit are distributed at the same time, one on each side of a "split" keyboard. Selling price and cost are

frequently handled at one run. In most cases, however, the large capacity counters could be split any way and could then handle twice as many classes within this group, as described above. For example, in a given case, selling price and cost could be distributed to only one half as many classes (departments, etc.) as either cost or selling price alone. Counters on some types of equipment can be "split" readily. Others require the "pumping in" of ciphers, between items in the split counter, or laborious tabulation. In some cases one operator may use two or three machines at one time, thus in effect doubling or tripling the number of classes or accounts handled at one run.

11. The number of classifications and sub-classifications causes more variance of opinion in the selection of a method and a machine than any other. The punched card tabulating men have a dictum something like this: "When we find three or more clerks putting the same information in two or more places, we investigate for punched cards." It is probable that the situation described represents the absolute minimum for such equipment, and some would place it much higher. It is easy to be misled at this point by disregarding the possibility of combination methods that produce two or more classifications at one operation. Frequently, too, the totals on one run can be used for a classification on a second basis without a rehandling of the media. Often one classification requires less detail than another and the totals of the media may be distributed by a hand-sort method. The development of short cuts and summary methods often materially reduces the apparent requirements for multi-handling of distribution media.

12. The number of classes (or accounts) in each classification and their activity are very important. Hand sorting to a large number of accounts requires more than one handling of the media. Machines are constructed with a limited maximum of counters and even the possibility of split counters, or more than one machine, may not solve the problem. Numerous runs through the same media may be unsatisfactory. Punched card tabulating equipment, other things being equal, handles most satisfactorily a large number of classes or accounts.

However, the method of distribution should not be determined by the total number of classes, if many of them are relatively inactive or active only irregularly. In some distributions, many inactive accounts may be omitted intermittently or altogether

from the distribution. In other cases distribution may be made regularly to all of the accounts, the most inactive accounts being handled by a short-cut method; e.g., assume a distribution to 400 accounts, with 85 per cent of the items falling into 20 or 30 active accounts. By method (4), using a multi-key-selected-register machine, it is possible to make distribution directly to the active accounts, using one counter for each class; one "miscellaneous" counter is reserved for the remainder of the items. A unit ticket is issued for each such item. Subsequently the items on these tickets are re-distributed to the inactive accounts, either on the same machine or by hand sorting the unit tickets.

13. The number of items in each class (or account). One or a very few items in each class may indicate that too much information is being obtained, that the classification is too finely drawn, that there are too many accounts. In a classification that is correctly designed, if there are not enough items per account to justify any kind of a sorting or summarizing process, posting by hand or machine to unit accounts may be desirable.

14. The routine subsequent to distribution-posting, preparation of reports, etc. The use of the information and the form in which it is to be presented should influence the method and machine selected for the distribution process. Some machine methods result automatically in an acceptable form of report. If the posting of totals and the copying of reports are burdensome, and they can be eliminated within the distribution process, it is a possibility to be considered.

15. Subsequent use of records, media reports, accounts, etc. In some cases the original media may be destroyed as soon as the summary figures are proved. Sometimes, however, there is legal or other necessity for filing or storing it for subsequent use. The same thing is true of certain types of reports. Some records are more easily stored than others; moreover, storage space is expensive. Some records are more accessible for abstracting information at subsequent periods; for example, punched cards are bulky and require considerable storage space. On the other hand, any information recorded on these cards can readily be abstracted at a subsequent period by methods almost entirely mechanical.

There may be other so-called variables which have not been included in this discussion. It is believed that the analysis of any distribution problem requires the determination of the value of each of these variables. Unfortunately there is no magic formula

which gives the correct answer when values are assigned to these factors mentioned. Usually some point towards one method, others to different methods. Only by carefully weighing the importance of each variable can a correct decision be made.

A few so-called general principles may be added:

1. The installation of a distribution method demands a determination of the purpose to be achieved and an evaluation of its importance, methods and machine research to select the proper method, experimentation with a section of the work, computation on the balance, and a careful weighing of the results.

2. Too much information should not be secured, i.e., information not worth its cost. The classification must not be too detailed. It may not be necessary to obtain full information about all the accounts in each classification.

3. Infrequent peak loads need not be provided for in the regular routine, if there is available competent outside service for assistance during these periods.

4. A frequent "methods audit" may indicate the necessity for a change in the distribution method. This may be due to changes within the organization, changes in information required, or in volume of transactions, or even in personnel; or it may be due to a change in methods and machines available. Improvements and developments in this field are amazingly rapid.

For the next decade research will be the most important problem in accounting and clerical work. So far the representatives of the accounting machine companies have been important factors in this field. Every day they are doing work that should be done by the accountant. Theoretically they do it free of charge, but the cost is there, of course, in the price of the machine. The cost of such service is not equitably distributed among purchasers. It is hoped that the time will come when the accountant will awaken to his full responsibility in this matter; then the research work incident to an accounting machine installation will have been completed when the accounting machine salesman appears on the scene. This should insure unbiased decision as to the method and machine selected. There is an economic need for organizations which will offer high grade service of this type.

To this point little reference has been made to the use of the punched-card tabulating method in the solution of distribution problems, because it is a complete topic in itself. It is unnecessary to describe the punched-card method. It is well known that

information is transcribed to a rectangular card by means of punching holes, that these punched cards are then sorted mechanically, or electrically, into any desired groups, and the results are accumulated and printed in report form. Originally a statistical analysis method, punched-card tabulation has been extended until almost any accounting function, under certain conditions, can be performed on this type of equipment.

Recent developments in the field of punched-card accounting include the following: an eighty and a ninety column card (the first one was forty-five columns); an improved electric punch that feeds and ejects cards; an improved reproducing punch for the replacement of a "set" of cards unfit for further sorting and tabulating; an automatic checking tabulator for verifying deductions; an interpreter for printing across the top of the card the information that has been punched into it; a matching device on the sorter for the automatic selection from duplicates of outstanding tabulating card checks; a card-counting printing sorter that counts cards on three columns and prints the results while sorting on a fourth column at the same time; direct subtraction; a class selection device that permits the use of corresponding fields on different cards for different purposes; a more rapid alphabetical tabulator; automatic printing of total on change of classification in any combination of card columns; an automatic compensating carriage-spacing device which spaces to starting line on next form of a series of continuous forms; a variable automatic stopping device for stopping after a predetermined number of items.

Ideal punched-card equipment might well include these additional improvements, some of which are in the process of development:*

1. A solid printing and accumulating bank of some 70 to 100 digits, with an unlimited split and normal device similar to that available on some full keyboard adding machines; this would greatly increase the capacity and flexibility of the equipment, and would decrease the necessary size of the report.

2. A feeding device on the tabulator for the rapid successive insertion and removal of forms, such as ledgers, invoices, etc., with a continuous journal sheet undisturbed.

3. A device for the introduction of amounts into the tabulator other than through a punched card, e.g., the pickup of an old

*Since this article was written the manufacturers of punch card tabulating systems have completed their development of several of the improvements described.—EDITOR.

ledger balance on a secondary keyboard, the current charges and credits coming from punched cards (see (7) below).

4. Elimination of visible dials on the horizontal type of tabulator, with the printing head moved over to the position now occupied by these dials, resulting in a more compact machine.

5. The wiring diagram on the horizontal tabulator moved to the level of the apron rather than below it.

6. Direct multiplication controlled by the punched card.

7. A device on the tabulator for the automatic punching of a summary card. This might eliminate the necessity for (3) above.

Punched-card accounting is making such rapid strides that there may be danger of hastily considered installations. Before selecting tabulating equipment for a given distribution job, the following factors should be considered:

1. The total number of distributions and sub-distributions to be made with these cards. All must be necessary, and not added merely to keep the machine busy.

2. Subsequent use for the punched cards.

3. Other work to be put on this equipment at less direct cost than by another method. This point may be eliminated by the possibility of outside tabulating service, unless the basic load is large enough.

4. Other equipment necessary in verification; obtaining of predetermined totals, controls, etc.

5. Need for current information between tabulator runs. (This is not general in case of distribution, but is important in some other types of punched-card installations.)

6. Computation of the full cost, including rent of equipment, card cost, operators' salaries, overhead, cost and operation of supplementary equipment, cost of additional vault and storage space for cards, if they are to be kept any length of time, etc. Computation of the full cost of alternative methods, and comparisons of them. Such a cost analysis is a very complex and difficult problem. The value of the additional information obtained by punched-card methods should be ascertained.

7. Determination and valuation for all methods; the accuracy of the information; the promptness with which it is obtained and presented in proper report form.

8. The possibility of transferring the whole job to a high grade tabulating service company, perhaps only temporarily until the system is complete. The savings effected are often substantial.

9. Availability of competent outside consulting service in making the installation, designing the form of the cards, final reports, etc. A careful analysis of this nature may avoid costly errors in any accounting machine installation.

In conclusion it is perhaps appropriate to look to the future of distribution methods. An installation in a department store in Pittsburgh is attracting a great deal of interest. There the sales audit (as well as inventory control and analysis of purchases) is being obtained by the tabulation of cards punched automatically as the employee on the floor records the sale of the merchandise. This installation has some of the features of an "ideal" method of distribution, but includes one possibly unnecessary step, the punched card. As an alternative, let us visualize a method of distribution which is completely automatic. For example, in a department store, as the employee records a sale on a transmitter on the sales floor, the amount of the sale is automatically (electrically) added into an electric adding dial representing the employee's daily sales, is added into another dial representing the department's daily sales, is added to the proper class of sales (cash, account, C.O.D., etc.), is deducted from the proper inventory account, is charged to a customer's ledger control account or added to the cash in the hands of the proper cashier, etc. These adding (and direct subtracting) dials are in a central machine room. At the end of the day a summary sheet is inserted at a central printing point and totals or sub-totals of all adding dials are printed on this summary sheet, and the analysis is completed. This may be fanciful, but it is not impossible and has been suggested.

It is possible to look still further into the future. The rapid progress of the photographic method of reproducing records suggests untold possibilities. Perhaps it will be possible to photograph original media, pass them over a cylinder, and thus actuate distribution machines. Conceivably the action of light waves may cause the operation of adding dials; perhaps the underlying principles of radio waves and television can be utilized in the solution of machine-accounting problems. The applications of such methods are in the distant future, of course, and in any case would be limited. Any such solution of present-day distribution problems is improbable. It is necessary to carry on under the methods now available. It is possible, however, to dream of electric adding dials, light waves, radio waves, etc., that may some day remove the routine drudgery of present distribution methods.